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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/032,305    02/27/98    HENNHOFFER

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IM62/0625

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EXAMINER

OKORO, B

ART UNIT

PAPER NUMBER

1765

DATE MAILED:

06/25/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
09/032,305

Applicant(s)

Hennhofer et al.

Examiner

Bernadine Okoro

Group Art Unit

1765



☒ Responsive to communication(s) filed on Feb 27, 1998

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-12 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-12 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1,2,4,6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakashima (US 5,643,368).

Nakashima discloses a process of cleaning a substrate and an apparatus for cleaning a substrate. Polishing a semiconductor wafer is known in the art to be the final step in producing a wafer. Polishing the semiconductor wafer provides for the smooth, planar surface. There are several steps that involve polishing or cleaning a wafer that Nakashima discloses in the reference. Nakashima discloses that the fabrication of semiconductor devices a cleaning process generally includes a chemical treatment process in which the substrate is immersed in a liquid of chemicals for surface treatment and a rinse process, which uses a large amount of pure water for removing the film of the chemical liquid from the surface of the substrate which is applied after removing the substrate from the cleaning solution. (Col. 1 lines 12-18) Nakashima discloses bringing the wafer into contact with an aqueous treatment solution. Nakashima discloses immersing the wafer

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in a cleaning solution with a mixture of s 32% hydrogen peroxiden an oxidizing agent and 98% sulfuric acid (Col. 1 lines 49-52) The Nakashima reference also teaches bringing the wafer into contact with the aqueous treatment agent solution by dipping the semiconductor wafer in the cleaning liquid, the aqueous solution. (Col. 2 lines 65-67) Nakashima discloses an apparatus used for cleaning semiconductor wafer wherein the cleaning solution comes in contact with the semiconductor wafer by immersing the wafer into the solution in the apparatus. Nakashima also discloses having a storage tank holding a pure amount of water to be used as a rinse, after the wafer has been immersed in chemical solution.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3,5,9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashima (US 5,643,368) in view of Parissis et al. (US 4,950,359) and in further view of Hayashida et al. (US 5,580,846)

Unlike the claimed invention, Nakashima does not disclose having an alkaline agent component wherein one of the alkaline base components consist of KOH, TMAH, KCO<sub>3</sub>, NH<sub>4</sub>OH and NaOH and mixtures thereof.

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Parissis et al. discloses a process used for removing a coating containing niobium from a substrate wherein the aqueous solution consists of an alkali metal hydroxide and of hydrogen. (Col. 1 lines 65-66) Parissis et al discloses that the alkali metal hydroxide can be sodium hydroxide or potassium hydroxide. It is conventional in the art to use TMAH and hydrogen peroxide to as an aqueous solution to remove particulates from the semiconductor wafer. It is also conventional to use ammonium hydroxide and hydrogen peroxide as a suitable aqueous solution. Parissis et al. discloses that at least 0.4 mole of metal hydroxide is used. (Col. 2 line 11) Parissis et al. discloses various amounts used for the alkali metal hydroxide and hydrogen peroxide which can be used for cleaning. It is known in the art to used a polishing pad or cloth and immerse the cloth or pad into the aqueous treatment solution before applying the cloth or pad to the semiconductor wafer surface.

Therefore, it is the examiner's position that the invention as a whole would have been obvious to one of ordinary skill in the art at the time of the claimed invention was made to modify Nakashima by providing a process of cleaning a semiconductor substrate which has an alkali metal oxide is chosen from one of the alkali metal oxide groups consisting of TMAH, KOH, NaOH,  $\text{NH}_4\text{OH}$  and  $\text{KCO}_3$  as per Parissis et al. because this additional step would have been anticipated to produce an expected result.

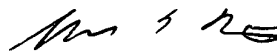
Unlike the claimed invention, Parissis et al. doesn't disclose in the reference an alkali metal hydroxide containing TMAH.

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Hayashida et al. discloses an invention relating to the improvements made in surface treatment agents and an improved process which is used to remove contaminants, particulates and other materials. Hayashida et al discloses in the reference using cleaning solutions comprising TMAH and hydrogen peroxide. (Col. 2 lines 42-45)

Therefore, it is the examiner's position that the invention as a whole would have been obvious to one of ordinary skill in the art at the time of the claimed invention was made to modify Parissis et al. by providing a cleaning solution which contains TMAH as per Hayashida et al. because it is known conventionally in the art to have an aqueous solution of TMAH used in combination of another oxidizing agent to be used in polishing a wafer surface.

5. Any inquiry concerning this communication should be directed to Examiner Bernadine Okoro whose telephone number is (703) 305-0888.

  
BENJAMIN UTECH  
PRIMARY EXAMINER  
GROUP 1100

BOO

June 21, 1999